EOS Mission Support Network Performance Report

This is a monthly summary of EMSnet performance testing -- comparing the performance against the requirements.

All results are reported on the web site: (Note correction) http://corn.eos.nasa.gov/performance/Net_Health/EMSnet_list.html. It shows MRTG-like graphs of the performance to various test sites. Six month graphs have been added to the 1 week and 2 month graphs.

Highlights:

- Continued testing through DAAC firewalls:
  - LDAAC firewall install began 13 June – all testing to or from LDAAC stopped at that time (partially restored through the firewall so far in July).
  - Testing GDAAC → LDAAC, NSIDC, EDC through firewalls
  - Now testing between GSFC and EDC via vBNS+
    - Through firewalls at GSFC, EDC, NSIDC, LDAAC
  - Thruput only; no pings or traceroute -- Working with ECS to add them
  - Also testing EDC, LDAAC and NSIDC to GDAAC

- Testing to ERSDAC finally restarted on June 4. New ATM circuit looks OK.

- Testing from GDAAC to PODAAC still inop – need firewall change at PODAAC. However, testing from GSFC-MODIS to PODAAC, and GSFC-CSAFS to JPL-SEAPAC.

- NOAA datasink restored June 6, testing from ASF and GSFC resumed. New Test from NASDA to NOAA working as of 25 June; thruput as expected.

- New Test from ASF to JPL-SEAPAC worked June 6-17, will try to restore. Thruput as expected.

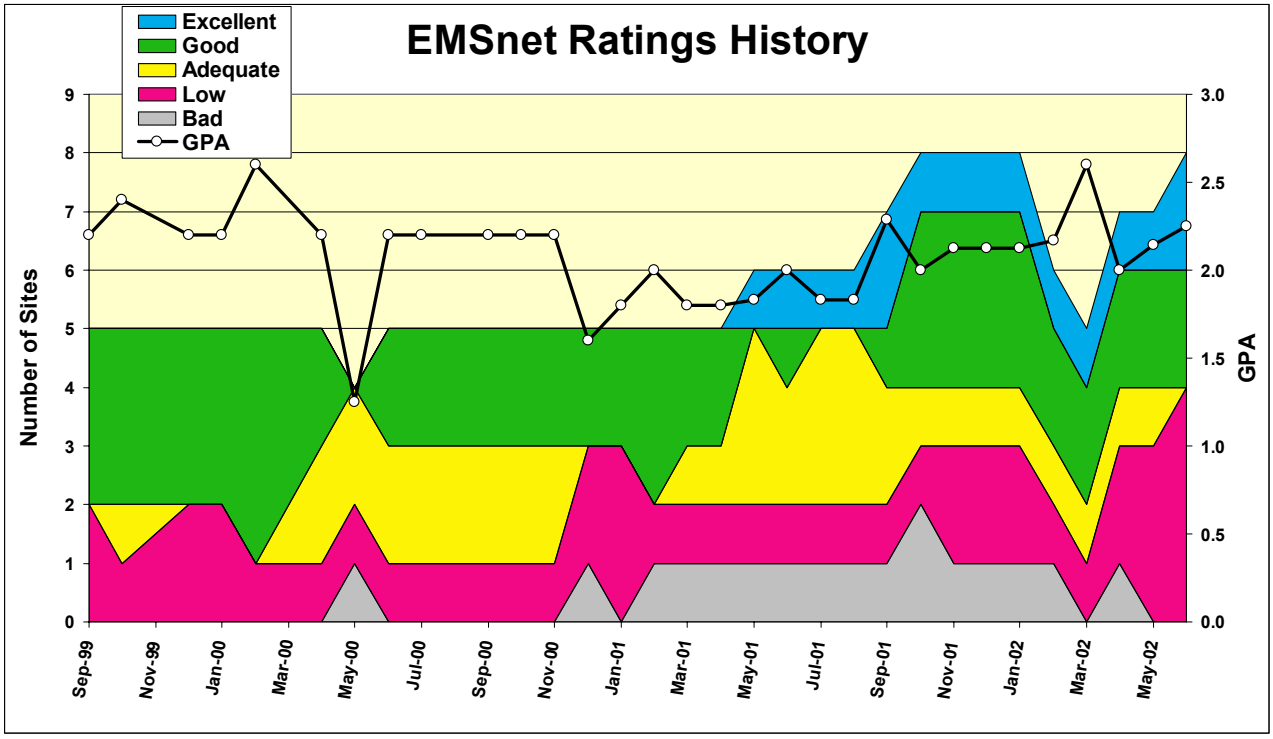
- Testing from NASDA to ASF stopped June 17 – will try to restore.

- Working with NASDA to use multiple TCP streams to overcome window size limitations in their test node.

- All other continuing tests had stable performance.

Ratings:

The chart below shows the number of sites in each classification since EMSnet testing started in September1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



Rating Categories:

Excellent: **Total Kbps** > Requirement * 3
Good: 1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate: Requirement < **Total Kbps** < Requirement * 1.3
Low: **Total Kbps** < Requirement.
Bad: **Total Kbps** < Requirement / 3

Where Total Kbps = MRTG + iperf monthly average

Ratings Changes:

Upgrades: ↑: None

Downgrades: ↓:

NASDA → CONUS: Adequate → **Low**

Testing Restarted:

ERSDAC: **Excellent**

EMSnet Sites:

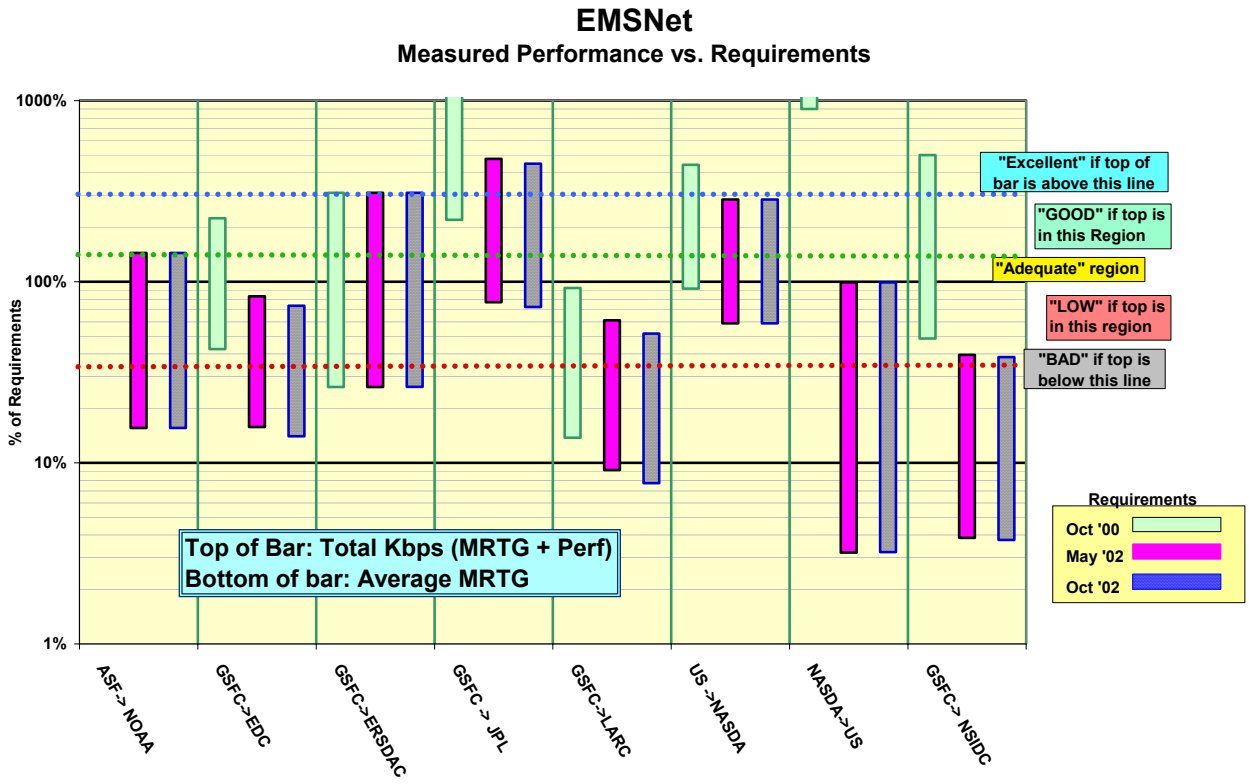
Network Requirements vs. Measured Performance

June 2002		Requirements (kbps)			Testing						
Source -> Destination	Team (s)	Previous (Oct '00)	Current (June '02)	Future (Oct '02)	Source Node : Test Period	MRTG Avg kbps	Perf Avg kbps	Total Avg kbps	Current Status re June '02*	Prev Stat	Current Status re Oct '02*
ASF-> NOAA	ADEOS II	0	1864	1864	ASF->NESDIS: 01-Apr-02 - 30-Jun-02	290	2395	2685	GOOD	G	GOOD
GSFC->EDC	MODIS, LandSat	82380	221938	250335	GSFC-DOORS: 15-Jun-02 - 30-Jun-02	34980	149631	184611	LOW	L	LOW
GSFC->ERSDAC	ASTER	275	275	275	GDAAC: 04-Jun-02 - 30-Jun-02	72	778	850	Excellent	N/A	Excellent
GSFC -> JPL	QuikScat, TES, MLS, etc.	299	851	906	CSAFS: 01-Apr-02 - 30-Jun-02	656	3406	4062	Excellent	E	Excellent
GSFC->LARC	CERES, MISR, MOPITT	63036	95277	112800	GSFC: 29-May-02 - 13-Jun-02	8675	49642	58317	LOW	L	LOW
US ->NASDA	QuikScat, TRMM, AMSR	555	863	863	CSAFS: 03-May-02 - 30-Jun-02	508	1949	2457	GOOD	G	GOOD
NASDA->US	AMSR	0.2	1574	1574	NASDA-EOC: 01-Sep-01 - 30-Jun-02	50	1512	1562	LOW	A	LOW
GSFC-> NSIDC	MODIS	8281	104971	108166	GDAAC: 03-May-02 - 30-Jun-02	4024	37433	41457	LOW	L	LOW

Notes:	All flow requirements listed are the greater of inflow or outflow							**Ratings**			
	Flow Requirements (from BAH) include TRMM, Terra , Aqua, QuikScat, ADEOS II							**Summary**		vs June '02	vs Oct '02
										Score	**Prev**	**Score**
***Criteria:**	**Excellent**	**Total Kbps** > Requirement * 3						**Excellent**		2	1	2
	GOOD	1.3 * Requirement <= **Total Kbps** < Requirement * 3						GOOD		2	2	2
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3						Adequate		0	1	0
	LOW	**Total Kbps** < Requirement						LOW		4	3	4
	BAD	**Total Kbps** < Requirement / 3						BAD		0	0	0
	Change History:	27-Sep-99	Original - TRMM, Terra, and QuikScat						**Total**	8	7	8
		19-Jan-01	Incorporated BAH requirements including additional missions									
		9-Apr-01	Updated BAH requirements						**GPA**	2.25	2.14	2.25
		4-Jun-01	Added 50% contingency to BAH requirements									
		16-Nov-01	Added MRTG to Iperf, updated requirements, Revised criteria									

Comparison of measured performance with Requirements:

This graph shows three bars for each destination. Each bar uses the same actual measured performance, but compares it to the requirements for three different times (Oct '00, Mar '02, and Oct '03). Thus as the requirements increase, the same measured performance will be a bit lower in comparison.



Note that the interpretation of these bars has changed from Sept '01. The bottom of each bar is the average measured MRTG flow to that site (previously daily minimum). Thus the bottom of each bar can be used to assess the relationship between the requirements and actual flows. Note that the requirements include a 50% contingency factor above what was specified by the projects, so a value of 66% would indicate that the project is flowing as much data as requested.

Details on individual sites:

1) ASF → CONUS: Rating: Continued Good

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
ASF → NESDIS	2701	2679	822	290	2969
ASF → GSFC-CSAFS	2696	2395	763		

Requirements:

Source → Dest	FY	mbps	Rating
ASF → NESDIS	'02, '03	1.86	Good

Comments: ASF host stabilized again June 6 (had been down since May 21). Also NESDIS host datasink restarted 5 June (had stopped 2 May). The 2.9 mbps total is about as expected for a 2 * T1 (3.1 mbps) circuit with competing flows. Since this is more than 30% over the April '02 requirement, the rating is "Good"

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2) GSFC → EDC: Rating: Continued Low

Test Results:

Source Node	Test Period	Medians of daily tests (mbps)				
		Best	Median	Worst	MRTG	TOTAL
GSFC DOORS	15-Jun-02 – 30 Jun-02	190.8	149.6	107.7	35.0	184.6
GSFC DAAC	29-May-02 – 30-Jun-02	166.4	114.4	49.7		

Requirements:

Date	mbps	Rating
June '02	222	Low
Oct '02	250	Low

On 28 May, the EDC circuit was switched to vBNS+. Multiple streams are used for thruput testing. On June 15, a test node was installed at the GSFC "Doors" to eliminate the effects of the GSFC DAAC ECS firewall. Performance from this test node is indeed superior than from the DAAC. Since it is more representative of the network performance, it will be used to determine the ratings.

Even so, the combined MRTG + thruput testing is below the requirement. Testing with vBNS+ indicates that the problem may lie in the host machines,and not the network. It is indeed a challenge to get over 200 mbps into or out of a single host.

Plans for July include installing a node at the EDC vBNS+ interface, similar to the "Doors" node at GSFC. Also planned are multi-host tests, where the flow between the DAACs can be added to the flow between test nodes over the same network.

3) GSFC → ERSDAC: Rating: N/A → Excellent

GSFC → ERSDAC Test Results:

Test Period	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
4-Jun-02 - 30-Jun-02	796	778	424	72	850

Testing re-established 4 June (had been down since Jan 19, when the GSFC DAAC firewall stopped further testing). Performance using new 1 mbps ATM connection looks good.

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → ERSDAC	'02, '03	275	Excellent

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4) JPL: Rating: Continued Excellent

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-CSAFS → JPL-SEAPAC	3875	3406	2021	656	4062
LaRC DAAC → JPL-TES	3733	3346	2642		
GSFC DAAC → JPL-TES	21315	12498	3879		
GSFC-MTVS1 → JPL-PODAAC	3867	3313	1700		
NASDA-EOC→ JPL-SEAPAC	2431	2411	1434		
ASF→ JPL-SEAPAC	2695	2580	1266		

Requirements:

Source → Dest	Date	mbps	Rating
GSFC-CSAFS → JPL-SEAPAC	June '02	550	Excellent
	Oct '02	906	Excellent
LaRC DAAC → JPL-TES	Oct '02	2050	Good

The rating is based on testing from CSAFS at GSFC to SEAPAC at JPL. Note that the MRTG flows to JPL include flows from all GSFC and LaRC sources, and also include flows destined to NASDA and ASF. The measured performance rates as "Excellent" compared with the Feb. '02 ICESAT requirement of 550 kbps. Other GSFC and LaRC sources have similar performance, all limited by the NISN GSFC→JPL VC configuration.

Testing from LDAAC stopped 18 June when the LARC ECS firewall was installed, blocking all testing from the LaRC DAAC. Hope to restore testing in July.

On May 8, the route from GDAAC to JPL-TES switched to NISN SIP. Performance improved substantially as a result. However, it is not clear whether this is the intended route for this flow.

NASDA → JPL-SEAPAC testing began 21 March 02. The 2.4 mbps typical thruput shows that the NASDA circuit is working well.

ASF → JPL-SEAPAC testing began working June 6, but stopped June 17, apparently due to firewall blocking at ASF. Thruput was steady at about 2.6 mbps, using the 2 T1s.

Testing from GSFC-DAAC to JPL-PODAAC requires a firewall change at PODAAC due to the firewall installation at GSFC; has been requested. Implementation expected next month

5) GSFC → LaRC: Rating: Continued Low

Test Results:

Test Period	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
28-May-02 – 13-June-02	51.8	49.6	41.3	8.7	58.3
9-Apr-02 - 28-May-02	41.0	35.2	25.3	18.5	53.7
23-Jan-02 - 7-Apr-02	44.1	36.1	22.4	12.2	48.3
1-Jan-02 – 19-Jan-02	40.8	35.0	32.1	7.5	42.5

Requirements:

Date	mbps	Rating
May '02	95	Low
Oct '02	113	Low

Testing to LaRC was moved back to GDAAC in May (from MTVS1 since 23 Jan) due to enabling of testing through GDAAC firewall. Starting 29 May, multiple TCP streams were used, to ensure that the firewall window size was not a limitation. This improved and stabilized performance, but is still below the requirement. The installation of the LaRC ECS firewall began June 13, stopping all performance testing to or from LaRC. This has been restored in July, with improved performance observed.

6A) US (GSFC) → NASDA: Rating: Continued Good

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-CSAFS → NASDA-EOC	2244	1949	635	508	2457

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → NASDA	'02, '03	863	Good

Testing since Jan 19 from GSFC-CSAFS, after installation of firewall at GSFC DAAC, blocking testing. Began using multiple TCP streams on May 3, to overcome the window size limitation of the NASDA test host. Performance improved to 2.3 mbps peaks (was 1.6), about as expected for a 3 mbps ATM PVC. Raing is still “Good”.

6B) NASDA → US (GSFC): Rating: Adequate → Low

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
NASDA-EOC → GSFC-CSAFS	1650	1512	774	50	1562

Requirements:

Source → Dest	FY	kbps	Rating
NASDA → GSFC	'02, '03	1574	Low

Performance is stable, but dropped slightly, and is now below the requirement. Again, performance appears limited by the NASDA machine window size (working with NASDA to remove this testing limitation.)

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7) NSIDC: Rating: Continued Low

GSFC → NSIDC Test Results:

Test Period	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
3-May-02 – 30-June-02	48.8	37.4	25.7	4.0	41.5
8-Apr-02 - 2-May-02	52.0	38.6	12.0	2.2	40.8
31-Oct-01 - 12-Jan-02	12.1	11.5	0.6	3.5	15.0

Requirements:

Date	mbps	Rating
June '0\	105	Low
Oct '02	108	Low

Testing to NSIDC from GDAAC via EMSnet resumed 8 April (it had stopped Jan 12 due to the installation of the ECS firewalls). There is no way to compare this to the pre-firewall configuration, since the circuit was changed while the testing was down for firewall installation. However, using multiple parallel TCP sessions did not appear to improve the overall thruput (its only effect appears to be raising the daily worst value – by grabbing a bigger share of the congested link).

Other Testing:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	Requirement	Rating
JPL → NSIDC-SIDADS	2585	2351	2125	260	Excellent
LDAAC - NSIDC	3714	3202	2624		

Performance is very stable, and appears limited by a NISN VCs.